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# Production of Wine by Using Apples and Bananas

Home Science

**KEYWORDS :** Wine, Fermentation, Alcoholic strength, Baker's yeast, KMS

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## ABSTRACT

*Wine can be made by using any plant extract or fruit juice that contains sufficient levels of fermentable sugars. However, most wine varieties were made from the matured berries of the grapes primarily cultivars of Vitis vinifera, which were grown in most of the regions of the world. Wine making is an important economic activity not only in the traditional countries of the world such as France and Germany, but also in new developing countries like China, Argentina.etc. Wine may be made from any fruit which contains sufficient levels of fermentable sugars and aromatic compound. Banana and apples are the fruits which contains sufficient amounts of sugars which plays an important role in the process of fermentation and these fruits also contains different aromatic volatile compounds which gives a characteristic flavor to the wine. Fresh fruit Juice extracted from apples and bananas were susceptible to oxidation and browning reactions which changes the characteristic aroma and flavor of the juice and ultimately it affects the quality of the wine. The oxidation reaction is mainly enzymatic but it can also occur without the mediation of enzymes. So, potassium metabisulphite (KMS) at the rate of 50-100 ppm was added to the juice to prevent the oxidation and browning reactions.*

*To 300ml of apple and banana juice of three different proportions (A, B and C) 90ppm Potassium metabisulphite (KMS) was added to prevent oxidation and browning reactions. To the final volume of the juice 30g of cane sugar was added to bring the Brix up to 18 - 20 to obtain alcoholic content up to10% by V/V. To the final preparation 10ml yeast culture was added and incubated at a temperature of 20±20c for a period of 21 days in laboratory conditions to assess the complete fermentation. After completion of fermentation wine was filtered, clarified and aged for a period of 3 months. Aged samples were compared with standard wine which is available in the local market. The three different proportions of wine samples were subjected to the sensory evaluation and Maximum scores for organoleptic characters like color, aroma, taste and overall acceptability was recorded. Among the three samples, sample C (apple and banana juice ratio (40%+60%)) had the better quality characteristics when compare to other samples A and B.*

## INTRODUCTION

Apple (Malus domestica) and Banana (Musa accuminata) are the most consumable and highly producing fruits of the world. These fruits are world famous with wide varieties. Different species of apple and bananas were spread over the world and these fruits can be used for wine production due to sufficient levels of fermentable sugars and aromatic compounds which gives a unique flavor to the wine (Idise.et.al. 2011). Apples as well as bananas contains nearly 8.9-11.9% of sugars (Tibor Fuleki. et.al., 1994).These fruits are virtually good source of aromatic compounds nearly over 300 compounds measured in the aroma profile of apples and bananas (Jonathan Dixon, Errol.W.Hewett, 2000).The major, important volatile compounds of apples are esters (78-92%)and alcohols(6-10%)(PawelStora.et.al.,2008) which are responsible for characteristic aroma of the wine.

Fruit wines are the refreshing diet beverages. Compared to the several alcoholic beverages, fruit wines are increasingly gaining their popularity with their different characteristic taste and aroma (Water C.Labys, 1976).The development of new wine products can increase the consumption of wine throughout the world. Even though grape wines are most popular, other fruit wines have not yet become popular due to traditionalism, cost of the raw fruits and availability, characteristic taste, flavor and some inherent problems associated with processing of fruits. Apple fruits are highly delicious, phenolic compounds present in apples are actively react with oxygen and exhibits brown color (Costeng.et.al.). These reactions are responsible in the juice for the characteristic color and flavor of the wine (Andrew Waterhouse&Felipe Laurie, 2006). So wines can be developed with apples and bananas. Low cost and effective wine making technologies and new top up techniques to enrich the wines with other flavoring compounds to enhance the acceptance of the fruit wines among the different traditional and developing countries have to be developed.

## Materials and methods

The present research was carried out to develop a unique variety wine by using two different types of pomacious fruits which are having wide variety characteristic volatile acids and aromatic compounds. Red delicious apple (Malus domestica), Banana (Musa accuminata) are the fruits used for the study. The study was designed with three different proportions of fruit juice and 3 months age period. Fruits of uniform color, size and shape were selected. Diseased, damaged and immature fruits were discarded. The selected fruits were cleaned with running tap water twice to remove the surface foreign materials and fruits were peeled out, placed in clean and sterilized container. Fruits were sliced and made in to pulp by using a blender/mixer, crushed pulp was mixed well and squeezed in double layered muslin cloth to obtain fresh and clear juice. The three samples(A,B,C) were treated with potassium meta bisulphite(KMS) at the rate of 90 ppm to prevent the oxidation and browning reactions(Ronald Jackson,2008).The ratio of juice samples taken were tabulated in the table no.1

**Table no.1 Fresh juice samples treated with potassium Meta bisulphate (KMS)**

| S. No | Sample Code | % of Apple + Banana juice. | Total Volume(ml) | KMS (ppm) |
|---|---|---|---|---|
| 1 | A | Apple juice 60%+ Banana Juice 40% | 300 | 90 |
| 2 | B | Apple juice 50%+ Banana Juice 50% | 300 | 90 |
| 3 | C | Apple juice 40%+ Banana Juice 60% | 300 | 90 |

After treating with KMS treatment, 5% yeast (Saccharomyces cerevisiae) culture was prepared and from that 10ml yeast culture was added to the Juice samples and allowed for fermentation. The fermentation process was carried out at a temperature of 200C ±2for a period of 21 days(K.C.fugelsang,1997). According to 21 days complete conversion of sugars into alcohols. Fermentation process was terminated by immersing fermentation vessel in hot water at a temperature of 65-680c for a period of 30-40 sec. After termination of fermentation wine was clarified by adding Bentonite(C.S.Ough,1992) and filtered through

whattman No.1 filter paper a clear clarified light golden color wine was obtained. Obtained wine was sterilized by immersing the wine bottles in a hot water which contains a temperature of 680Cfor a period of 30-40 sec. After completion of sterilization, the wine samples was transferred in to aseptic bottles and labeled as A, B, C in accordance with their proportions of juice. Bottles were screw caped .The three wine samples A, B and C were kept for ageing for a period of 3 months at room temperature in laboratory. After completion of ageing wine samples were analyzed to trace out the alcohol content and subjected to sensory evaluation.

**Results**

The sensory evaluation of all three samples A, B and C was carried out using 5 point hedonic scale and the data was expressed in terms of mean scores and presented in table no.2.

**Table no: 2 Sensory / Organoleptic evaluation of wine samples**

| S.No. | Sample | Vol. of wine | Age period | Color | Aroma | Appearance | Taste | Overall Acceptance | % of Alcohol |
|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 240ml | 3 months | 4.3 | 4.5 | 5 | 4.5 | 4.6 | 8.5 |
| 2 | B | 240ml | 3 months | 4.2 | 4.5 | 5 | 4.2 | 4.5 | 9.6 |
| 3 | C | 240ml | 3 months | 4.6 | 4.7 | 5 | 5 | 4.8 | 9.8 |

Among the three samples C recorded highest score for overall acceptability 4.8 followed by A (4.6), where as significantly lowest score was observed in B (4.5). The sample C recorded highest levels of alcoholic content that means 9.8% v/v followed by B which contains 9.6% v/v. whereas significantly lowest alcoholic content was recorded in sample A by means of 8.5 % v/v. The results indicated that among the three samples (A, B, C), C having the highest overall acceptability and alcoholic content. Hence sample C was considered as the acceptable composition for the production of wine.

**DISCUSSION**

Processing of Apple and Banana juice is very important because of its highly oxidative nature. The processed juice can be used for the further fermentation process, keeping quality of juice is very important in making of wine. But processing and preservation of fruit juices at ambient conditions is not possible without addition of any chemical preservatives because of its high nutritional composition and its effective oxidative nature. The fruit juices are rich source of sugars, minerals, vitamins, organic and volatile compounds which act as good source of food for spoilage microorganisms as well as phenolic compounds which are present in fruits may responsible for the enzymatic browning reactions which changes the color and aroma of the wine. Thus any of the processing method either alone or in combination is a prerequisite for extending the keeping quality of fruit juice at optimum temperatures which is farther used for the preparation of wine. In the present study a combination of apple and banana with three proportions was formulated and wine was developed and kept for ageing about 3 months because the wine quality that means taste and aroma were depended up on the ageing of the wine, long period of ageing results improved aroma and taste.Wine was subjected to organoleptic evaluation. Among the three samples, sample 'C' with 40% apple and 60% banana juice scored better than the other two compositions. The alcohol present was 9.8% in sample C whereas it was 8.5% and 9.6% in sample A and B respectively for the high organoleptic scores of the sample 'C'.

**CONCLUSION**

On the basis of experimental results it can be concluded that the overall acceptability of the wine increases by increasing the strength of alcohol, while decreases with low level. The different characteristic taste of the wine was due to the blending of two different types of fruits which gave different characteristic color and aroma to the wine and this type of formulation gave unique character to the wine.

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